REMARKS/ARGUMENTS

The Examiner is thanked for the performance of a thorough search.

By this amendment, Claims 1, 2, 4-6, 11, 12, 17, 18, 20-32, and 34-37 are amended, Claims 3 and 19 are canceled, and Claims 38-47 are added. Hence, Claims 1, 2, 4-18, 20-32 and 34-47 are pending in the application.

I. SUMMARY OF THE REJECTIONS

A. 35 U.S.C. § 101

Claims 1 and 34 stand rejected under 35 U.S.C. § 101 as allegedly directed to non-statutory subject matter. The Office Action stated that Claims 1 and 34 (and their respective dependent claims) recite a computer readable medium. However, Claim 1 is a method claim. It is presumed, therefore, that the Office Action intended to reject claims 17-32 and 34-37, each of which previously recited a computer-readable medium.

Present Claims 17, 18, 20-32, 34-37, and 43-47 are directed towards a computer-readable **storage** medium. The plain meaning of "a computer-readable storage medium storing…instructions" requires that the storage medium ***store*** the instructions so that they may be read by a computer. A signal is not a computer-readable storage medium because a signal is not a medium that is capable of storing instructions that may be read by a computer. While it is true that a signal may *carry* instructions, those instructions carried by a signal are not *stored*. For example, volatile or non-volatile memories may store instructions, whereas a signal cannot. The Applicants acknowledge that the Office's current position is that signals are not patentable subject matter, but a computer-readable storage medium is not a signal.

The Patent Office has previously acknowledged that claims directed to a computer-readable storage medium are patentable (see *In re Beauregard*). Even after the adoption of

the current Interim Guidelines, the USPTO continues to issue many patents with claims directed towards a computer-readable storage medium.

Further, a computer-readable storage medium qualifies as an article of manufacture, which is expressly recognized as patentable subject matter under 35 U.S.C. § 101.

Consequently, it is respectfully submitted that each of Claims 17, 18, 20-32, 34-37, and 43-47 is directed towards statutory subject matter, and the rejection made under 35 U.S.C. § 101 is respectfully requested to be withdrawn.

B. 35 U.S.C. § 103(a)

Claims 1, 2, 4-18, 20-32, and 34-37 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,298,342 issued to Graefe et al. ("*Graefe*") in view of U.S. Patent No. 7,080,081 issued to Agarwal et al. ("*Agarwal*"). This rejection is respectfully traversed.

II. THE REJECTIONS BASED ON THE PRIOR ART

Claims 1, 2, 4-18, 20-32, and 34-37 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over *Graefe* in view of *Agarwal*.

A. CLAIM 1

Present Claim 1 recites:

> A machine implemented method comprising:
> accessing rows in a database table, wherein:
> each row in the database table corresponds to a dimension-value combination for a set of one or more of dimensions;
> the database table is composed of a plurality of segments, wherein **each segment of the plurality of segments corresponds to a different contiguous range of dimension-value combinations**;
> the segment into which a row of the database table is stored is the segment that corresponds to the contiguous range that includes

the dimension-value combination to which the row corresponds;

within each segment of the plurality of segments, rows of the database table are stored at locations based on the dimension-value combination to which the rows correspond; and

wherein accessing rows in the database table includes, in response to receiving a request that indicates a particular dimension-value combination:

using the particular dimension-value combination for determining a particular segment of the plurality of segments that stores a particular row that corresponds to the particular dimension-value combination; and

accessing the particular row within the particular segment. (emphasis added)

Claim 1 recites "within each segment of the plurality of segments, rows of the database table are stored at locations based on the dimension-value combination to which the row corresponds." *Graefe* and *Agarwal*, individually or in combination, fail to teach or suggest that rows within a segment are stored based on the dimension-value combination to which the row corresponds. "Blocks" and "squares" in *Agarwal* are the most analogous elements in the cited art to the "segment" of Claim 1; however, neither "blocks" nor "squares" are equivalent to a "segment" as claimed.

According to *Agarwal*, records in a table are stored in blocks (col. 5, lines 57-58). The grid in FIG. 3 of *Agarwal* represents a logical partitioning of such blocks, and each square (e.g., square 302) represents a logical cell (col. 5, lines 63-66). A "square" of *Agarwal* cannot be equated to a "segment" because a segment stores rows whereas a square does not. A square is simply a logical partition of blocks, which blocks are the units that actually store rows

Even if a square did store rows, *Agarwal* fails to teach or suggest that records in a table are stored **within** a square or block based on the dimension-value combination to which the record corresponds, as Claim 1 would require. According to *Agarwal*, a block in which a

record is stored is based on a dimension-value. Also, a square to which a block corresponds is based on a dimension-value. However, *Agarwal* does not teach where **within** a block or square a record is stored, much less that records are stored within a block or square based on the dimension-value combination to which the records correspond.

Furthermore, the "block" of *Agarwal* cannot be equated to the "segment" of Claim 1 because Claim 1 recites that each segment corresponds to a **different** contiguous range of dimension-value combinations. The "block" of *Agarwal* does not satisfy this criteria because, as illustrated in FIGs. 3 and 4 of *Agarwal*, multiple blocks (e.g., 2, 15, 17, 31, 33, and 43) correspond to the **same** contiguous range of dimension-value combinations.

Graefe also fails to teach or suggest the above-bolded features of Claim 1. Therefore, even if *Graefe* and *Agarwal* could be combined, the combination would still fail to teach or suggest all features of Claim 1. Therefore, reconsideration and withdrawal of the rejection of Claim 1 under 35 U.S.C. § 103(a) is respectfully requested.

B. CLAIM 34

Present Claim 34 recites:

> A computer-readable storage medium that is readable by a database system, having stored therein at least:
> a database table containing a plurality of data items on the computer readable media that correspond to locations associated with at least one dimension value;
> **wherein each data item of the plurality of data items is stored in the table in an order dictated by a dimension value combination to which said each data item corresponds**, wherein the dimension value combination, to which said each data item corresponds, corresponds to one or more dimension columns defined for the database table; and
> **wherein the database table does not store values for the one or more dimension columns**. (emphasis added)

At least the above-bolded features of Claim 34 are not taught or suggested by the cited art.

1. The cited art fails to teach or suggest that data items are stored in a table in an order

Claim 34 recites that "each data item of the plurality of data items is stored in the table in an order dictated by a dimension value combination to which said each data item corresponds." The Office Action cites col. 7, lines 50-63 of *Agarwal* for disclosing this feature of Claim 34. It is respectfully submitted that this is incorrect. That cited portion of *Agarwal* merely states:

> Consider the 3-dimensional cube shown in FIG. 6 which is dimensioned along the YearAndMonth dimension 300, the Province dimension 310, and the Color dimension 600. A query such as the following: "What is the aggregate sales of Color=`Red` over all dates and regions?" could be processed in several different ways. The choices for processing this query include: 1) Table Scan: Scan the entire table and only select the rows with Color=`Red`. 2) Block Scan: Use the block index on Color to narrow down the search to a specific set of blocks. 3) Record Scan: Use a record-based index on Color (if it exists) to narrow down the search to a specific set of records.

This cited portion of *Agarwal* fails to teach or suggest that a record (i.e., the alleged data item) in the table is stored in an order, much less an order dictated by the dimension value to which the record corresponds. *Graefe*, in fact, is explicit about the inherent nature of typical tables, which is that "rows in a relational table…have no particular order" (col. 8, lines 44-45).

2. The cited art fails to teach or suggest that a table does not store values for a particular dimension column

Claim 34 additionally recites that a database table does not store values for a dimension column. The Office Action asserts that col. 8, lines 61-63 and col. 9, lines 1-2 of *Graefe* discloses this feature of Claim 34. It is respectfully submitted that this is also incorrect. These portions of *Graefe* merely state, respectively:

> As mentioned above, a row in the input table does not appear in the output if its value does not appear in the pivot list.

> For output columns not having a corresponding input row, the value is NULL, a special value defined in SQL.

According to Claim 34, although a database table does not store values for a particular dimension column, a data item that is associated with a dimension value of that particular dimension column is still stored in the table. However, the first cited portion of *Graefe* merely teaches that an entire row (i.e., the alleged data item) does not appear in an output table.

With respect to the second cited portion of *Graefe*, the Office Action seems to equate the "output column" of *Graefe* with the "particular dimension column" of Claim 34. However, that portion of *Graefe* states that an output column may not have a corresponding row (i.e., the alleged data item). In contrast, Claim 34 recites that the particular dimension column has corresponding data items.

Based on the foregoing, *Graefe* and *Agarwal*, individually or in combination, fail to teach or suggest all features of Claim 34. Reconsideration and withdrawal of the rejection of Claim 34 under 35 U.S.C. § 103(a) is therefore respectfully requested.

C. CLAIM 38

Claim 38 recites:

> A machine-implemented method comprising:
> accessing rows in a database table, wherein:
> each row in the database table corresponds to a dimension-value combination for a set of one or more of dimensions;
> the database table is composed of a plurality of segments, **wherein each segment of the plurality of segments corresponds to a different contiguous range of dimension-value combinations**;
> the segment into which a row of the database table is stored is the segment that corresponds to the contiguous range that includes the dimension-value combination to which the row corresponds;

> wherein accessing rows in the database table includes, in response to receiving a request that indicates a particular dimension-value combination:
> using the particular dimension-value combination for **locating an entry in an index that includes a plurality of entries, wherein each segment of the plurality of segments is represented by a different single entry in the index**; and
> accessing the particular row based on information contained in the index entry. (emphasis added).

The cited art fails to teach or suggest at least the above-bolded features of Claim 38. Although *Graefe* refers to an index generally, *Graefe* fails to disclose details about entries in the index. Therefore, the following remarks are directed to *Agarwal*.

The "block index" of *Agarwal* is the most analogous element to the "index" of Claim 38. Claim 38 recites, however, that the index includes a plurality of entries and segment is represented by a **different entry** of the plurality of entries. *Agarwal* teaches that the entries in the block index correspond to a different block. The "block" of *Agarwal* cannot be equated to the "segment" of Claim 38 because Claim 38 recites that each segment corresponds to a **different** contiguous range of dimension-value combinations. The "block" of *Agarwal* does not satisfy this criteria because, as illustrated in FIGs. 3 and 4 of *Agarwal*, multiple blocks correspond to the **same** contiguous range of dimension-value combinations.

Furthermore, as stated previously, the "square" of *Agarwal* cannot be a "segment" of Claim 38, because a square does not store rows. A square is simply a logical partition of blocks, which blocks are the units that actually store the rows.

Based on the foregoing, *Graefe* and *Agarwal*, individually or in combination, fail to teach or suggest all features of Claim 38. Reconsideration and withdrawal of the rejection of Claim 38 under 35 U.S.C. § 103(a) is therefore respectfully requested.

D. CLAIM 39

Claim 39 recites:

> A machine-implemented method comprising:
> determining a plurality of ranges based on dimension-value combinations to which rows in a table correspond;
> wherein each range of the plurality of ranges is a different range of dimension-value combinations for a set of one or more dimensions;
> wherein each row in the table corresponds to a dimension-value combination;
> **wherein the plurality of ranges is determined such that the table includes rows that correspond to every dimension-value combination that belongs to each range of the plurality of ranges**;
> **for each range of the plurality of ranges, creating a segment that stores only rows, from the table, that have dimension-value combinations that fall within the range that corresponds to said each segment**. (emphasis added)

The cited art fails to teach or suggest at least the above-bolded features of Claim 39.

1. The cited art fails to disclose how the ranges are determined

Claim 39 recites that the recited "plurality of ranges is determined such that the table includes rows that correspond to **every dimension-value combination** that belongs to each range of the plurality of ranges." Neither *Graefe* nor *Agarwal* teaches or suggests that a plurality of ranges of dimension-value combinations is determined in such a way.

2. The cited art fails to disclose the creating step of Claim 39

Claim 39 also recites that a segment is created for each range and that each segment stores only rows from the table that have dimension-value combinations that fall within the range that corresponds to that segment. Also, each range of the plurality of ranges corresponds to a different range of dimension-value combinations. *Graefe* and *Agarwal* also fail to teach or suggest this feature of Claim 39. Again, the "square" of *Agarwal* does not store rows. Also, if the "block" of *Agarwal* is attempted to be equated with the recited segment, then there could only be a **single** block per square (e.g., Province-AB or Province-

ON), which, at best, represents a single dimension-value combination. However, as FIGs. 3-4 of *Agarwal* illustrate, there are **multiple** blocks per square. Furthermore, nothing in *Graefe* is equivalent to the recited segment of Claim 39.

Based on the foregoing, *Graefe* and *Agarwal*, individually or in combination, fail to teach or suggest all features of Claim 39. Reconsideration and withdrawal of the rejection of Claim 39 under 35 U.S.C. § 103(a) is therefore respectfully requested.

E. DEPENDENT CLAIMS

The remaining claims not discussed thus far are dependent claims, each of which depends (directly or indirectly) on one of Claims 1, 34, 38 or 39 discussed above. Each of the dependent claims is therefore allowable for the reasons given above for the claim on which it depends. In addition, each of the dependent claims introduces one or more additional limitations that independently render it patentable.

For example, Claim 40 recites "storing rows, within each segment, in an order that is based on the dimension-value combinations of the rows." Neither of the cited references teaches or suggests that an rows are stored in an order, much less stored in an order within a segment. As stated previously, *Graefe* specifically discloses that rows in a table "have no particular order." Furthermore, even if the recited segment could be equated to the block or the square of *Agarwal* (which it cannot), the records within the block or square of *Agarwal* are not stored in an order, much less in an order based on dimension-value combinations of the records.

Due to the fundamental differences already identified, to expedite the positive resolution of this case, a separate discussion of all limitations that independently render the dependent claims patentable is not included at this time. The Applicant reserves the right to

further point out the differences between the cited art and the novel features recited in the dependent claims.

III. CONCLUSION

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

Please charge any shortages or credit any overages to Deposit Account No. 50-1302.

Respectfully submitted,

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